Ultra-Flexible Advanced Stiffness Truss for Large Solar Arrays, Phase I

Completed Technology Project (2014 - 2014)

Project Introduction

L☐Garde will develop a lightweight Ultra-Flexible Advanced Stiffness Truss (Ultra-FAST) that will prove to have greater material metrics and structural performance indices than the current state of the art for large space deployable trusses. The key to the success of the proposed technology has to do with the new design approach and new material development. First, customized components will be fabricated such as thin-walled longerons and short flexure hinges in Phase I. The proposed flexure hinges have higher effective compressive strain values in bending than traditional compressive materials. These two key components have low density values not greater than 1,800 kg/m3 and are made of high performance carbon fibers. The estimated total truss mass per length is approximately 0.167 kg/m. L/d=100 slenderness longerons made of thin-walled tubes will guarantee a high axial and bending stiffness truss because they have a higher area moment of inertia compared with traditional solid rods. An axial load will be applied in order to measure the axial stiffness and axial strength of the truss. Also, bending moment will be applied to measure the bending stiffness and bending strength.

Primary U.S. Work Locations and Key Partners

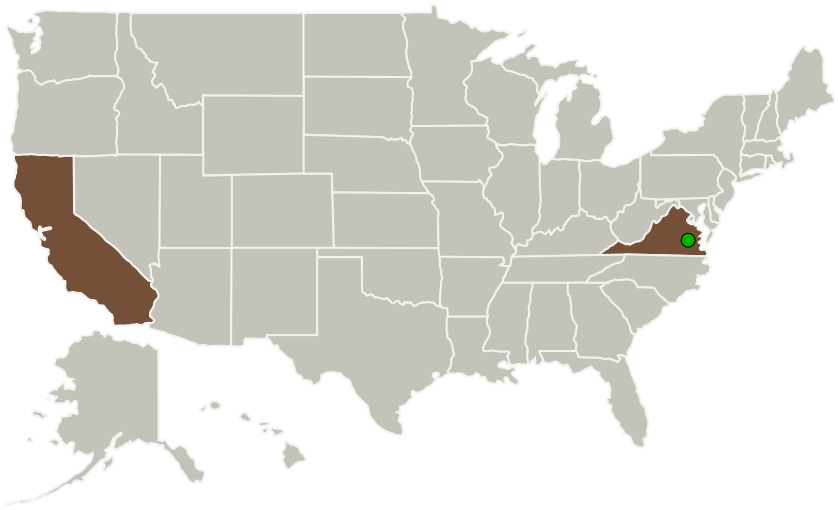

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Table of Contents

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Organizations Performing Work	Role	Type	Location
L'Garde, Inc.	Lead Organization	Industry Small Disadvantaged Business (SDB)	Tustin, California
Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

Primary U.S. Work Locations	
California	Virginia

Project Transitions

June 2014: Project Start

December 2014: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/139576)*

Images

Briefing Chart
Ultra-Flexible Advanced Stiffness Truss for Large Solar Arrays, Phase I
(https://techport.nasa.gov/image/131210)

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
L'Garde, Inc.

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Juan M Mejia-ariza

Co-Investigator:
Juan Mejia-ariza

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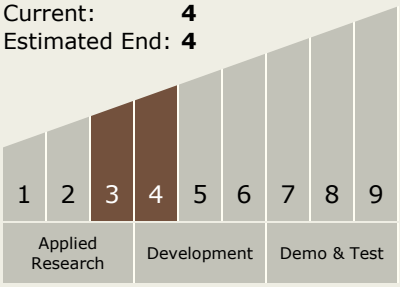
Technology Maturity (TRL)

Start: **3**
Current: **4**
Estimated End: **4**



Technology Areas

Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
  - TX12.2 Structures
    - TX12.2.1 Lightweight Concepts

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System